FATIGUE OF ENGINEERING MATERIALS AND STRUCTURES

The International Journal

Editor: K.J. MILLER University of Sheffield

Volume Contents and Author Index to Volume 7, 1984

OL.
7
984

Pergamon Press: Oxford · New York · Toronto · Paris · Frankfurt

FATIGUE OF ENGINEERING MATERIALS AND STRUCTURES

The International Journal

EDITOR

K. J. MILLER, Department of Mechanical Engineering, University of Sheffield, Mappin Street, Sheffield S1 3JD, U.K.

BOARD OF DIRECTORS OF FATIGUE OF ENGINEERING MATERIALS LTD

B. A. Bilby
C. J. Beevers
L. F. Coffin
D. S. Dugdale
N. E. Frost
G. W. Greenwood
C. Laird
K. J. Miller (*Chairman*)
B. Tomkins

EDITORIAL BOARD

A. S. Argon, Massachusetts Institute of Technology, Cambridge, MA
M. F. Ashby, University of Cambridge, U.K.
G. I. Barenblatt, Moscow, U.S.S.R.
J. M. Barsom, U.S. Steel Research Laboratories, Monroeville, PA
C. J. Beevers, University of Birmingham, U.K.
B. A. Bilby, University of Sheffield, U.K.
C. R. Brinkman, Oak Ridge National Laboratory, TN
L. M. Brown, University of Cambridge, U.K.
M. W. Brown, University of Sheffield, U.K.
J. Carlsson, Royal Institute of Technology, Stockholm, Sweden
Z. M. Cheng, Chinese Academy of Sciences, Beijing, China
L. F. Coffin, General Electric Co. Research and Development Center, NY
B. J. Darlaston, Central Electricity Generating Board, Berkeley, U.K.
N. E. Dowling, Virginia Polytechnic Institute, VA
D. S. Dugdale, University of Sheffield, U.K.
E. G. Ellison, University of Bristol, U.K.
J. M. Finney, Aeronautical Research Laboratories, Melbourne, Australia
D. Francois, U.T.C. Département de Génie Mécanique, Compiegne, France
N. E. Frost, National Engineering Laboratory, East Kilbride, U.K.
G. W. Greenwood, University of Sheffield, U.K.
H. Kitagawa, University of Tokyo, Japan
M. Klesnil, Czechoslovak Academy of Sciences, Brno, Czechoslovakia
J. F. Knott, University of Cambridge, U.K.
J. M. Krafft, Naval Research Laboratory, Washington, DC
T. Kunio, Keio University, Yokohama, Japan
C. Laird, University of Pennsylvania, Philadelphia, PA
R. W. Landgraf, Ford Motor Company, Dearborn, MI
J. Lankford, Southwest Research Institute, San Antonio, TX
I. LeMay, University of Saskatchewan, Saskatoon, Canada
Hao Lee, Huazhong University of Science and Technology, Wuhan, China
T. C. Lindley, Central Electricity Generating Board, Leatherhead, U.K.
H. W. Liu, Syracuse University, NY
E. Macherauch, University of Karlsruhe, West Germany
A. J. McEvily, University of Connecticut, Storrs, CT
S. S. Manson, Case Western Reserve University, Cleveland, OH
J. Morrow, University of Illinois, Urbana, IL
D. F. Mowbray, General Electric Co., Schenectady, NY
J. Němec, Prague, Czechoslovakia
J. C. Newman, National Aeronautics and Space Administration, Hampton, VA
K. Ohji, Osaka University, Japan
V. V. Panasyuk, Institute for Physics and Mechanics, Lvov, U.S.S.R.
R. N. Parkins, Newcastle University, Newcastle-upon-Tyne, U.K.
K. J. Pascoe, University of Cambridge, U.K.
R. M. Pelloux, Massachusetts Institute of Technology, Cambridge, MA
A. Pineau, Ecole nationale supérieure des Mines de Paris, Evry, Cedex, France
G. S. Pisarenko, Institute for Problems of Strength, Kiev, U.S.S.R.
W. J. Plumbridge, University of Bristol, U.K.
Y. N. Rabotnov, Moscow State University, U.S.S.R.
R. O. Ritchie, University of California, Berkeley, CA
J. Schijve, Delft University of Technology, The Netherlands
R. A. Smith, University of Cambridge, U.K.
D. Socie, University of Illinois, IL
M. O. Speidel, Brown, Boveri & Co. Ltd, Baden, Switzerland
P. Stanley, University of Manchester, U.K.
G. Sumner, United Kingdom Atomic Energy Authority, Preston, U.K.
D. M. R. Taplin, Trinity College, Dublin, Ireland
B. Tomkins, United Kingdom Atomic Energy Authority, Preston, U.K.
V. T. Troshchenko, Institute for Problems of Strength, Kiev, U.S.S.R.
P. Watson, G.K.N. Group Technological Centre, Wolverhampton, U.K.
A. A. Wells, The Welding Institute, Cambridge, U.K.
T. Yokobori, Thoku University, Sendai, Japan

VOL. 7 1984

Published quarterly

Publishing Office: Journals Production Unit, Hennock Road, Marsh Barton, Exeter, Devon EX2 8RP, England (*Tel.* Exeter (0392) 51558: *Telex* 42749).

Subscription Enquiries and Advertising Office: *North America*: Pergamon Press Inc., Maxwell House, Fairview Park, Elmsford, NY 10523, U.S.A., *Rest of the World*: Pergamon Press Ltd, Headington Hill Hall, Oxford OX3 0BW, England (*Tel.* Oxford (0865) 64881).

Annual Subscription Rates 1985: For libraries, university departments, government laboratories, industrial and other multiple-reader institutions US $125 per annum: 2-yr rate (1985/1986) US $237.50 (including postage and insurance).

Specially Reduced Rates to Individuals: In the interests of maximizing the dissemination of the research results published in this important international journal we have established a two-tier price structure. Any individual whose institution takes out a library subscription, may purchase a second or additional subscription for personal use at the reduced rate of US $45.00.

Microform Subscriptions and Back Issues: Back issues of all previously published volumes are available in the regular editions and on microfilm and microfiche. Current subscription are available on microfiche simultaneously with the paper edition and on microfilm on completion of the annual index at the end of the subscription year.

Copyright © 1984 Fatigue of Engineering Materials Ltd

It is a condition of publication that manuscripts submitted to this journal have not been published and will not be simultaneously submitted or published elsewhere. By submitting a manuscript, the authors agree that the copyright for their article is transferred to Fatigue of Engineering Materials Ltd if and when the article is accepted for publication. However, assignment of copyright is not required from authors who work for organizations which do not permit such assignment. The copyright covers the exclusive rights to reproduce and distribute the article, including reprints, photographic reproductions, microform or any other reproductions of similar nature and translations. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, electrostatic, magnetic tape, mechanical, photocopying, recording or otherwise, without permission in writing from the copyright holder.

Photocopying information for users in the U.S.A.

The Item-Fee-Code for this publication that authorization to photocopy items for internal or personal use is granted by the copyright holder for libraries and other users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service provided the stated fee for copying, beyond that permitted by Section 107 or 108 of the US Copyright Law, is paid. The appropriate remittance of $3.00 per copy per article is paid directly to the Copyright Clearance Center Inc., 21 Congress Street, Salem, MA 01970. The copyright owner's consent does not extend to copying for general distribution, for promotion, for creating new works or for resale. Specific written permission must be obtained from the publisher for such copying. In case of doubt please contact your nearest Pergamon office.

The Item-Fee Code for this publication is: 0160-4112/84 $3.00 + 0.00

PERGAMON PRESS

HEADINGTON HILL HALL, OXFORD OX3 0BW
MAXWELL HOUSE, FAIRVIEW PARK, ELMSFORD, NY 10523

CONTENTS

Number 1

V. V. Panasyuk, L. V. Ratych and I. N. Dmytrakh	1	Fatigue crack growth in corrosive environments
M. Gabra and C. Bathias	13	Fatigue crack initiation in aluminium alloys under programmed block loading
D. L. Davidson and J. Lankford	29	Fatigue crack tip mechanics of a powder metallurgy aluminum alloy in vacuum and humid air
He Qingzhi	41	A model for calculating the fatigue crack opening load and its applications
J.-O. Nilsson	55	The influence of nitrogen on high temperature low cycle fatigue behaviour of austenitic stainless steels
L. P. Pook and A. F. Greenan	65	Fatigue-crack arrest in mild steel specimens under constant amplitude loading
D. A. Kelly and G. Singh	75	Creep life of AISI 316 stainless steel subjected at 550 C to step changes in tensile load
	i	Announcements
	iii	Information on Conferences/Seminars

Number 2

Naomi Hamada, Masao Sakane and Masateru Ohnami	85	Creep–fatigue studies under a biaxial stress state at elevated temperature
E. R. de los Rios, Z. Tang and K. J. Miller	97	Short crack fatigue behaviour in a medium carbon steel
Keiro Tokaji and Zenji Ando	109	Small fatigue crack growth behaviour under two stress level multiple loading
J. J. Scutti, R. M. Pelloux and R. Fuquen-Moleno	121	Fatigue behavior of a rail steel

J. P. Pedron, A. Diboine and A. Pineau	137	Fatigue crack growth rate behaviour of stainless steel claddings in air and under vacuum at 300°C
Susumu Horibe, Jia-Kuen Lee and Campbell Laird	145	Cyclic deformation of Al–4%Cu alloy polycrystals containing θ'' precipitates. Grain size dependence and correlation with monocrystalline cyclic deformation
C. W. Brown and G. C. Smith	155	The effect of rest periods on the fatigue strength of Ti–6Al–4V
	i	Announcements
	ii	Information on Conferences/Seminars

Number 3

C. T. Hua and D. F. Socie	165	Fatigue damage in 1045 steel under constant amplitude biaxial loading
R. S. Vecchio, R. W. Hertzberg and R. Jaccard	181	On the overload induced fatigue crack propagation behavior in aluminium and steel alloys
K. Tanaka, S. Matsuoka and M. Kimura	195	Fatigue strength of 7075–T6 aluminium alloy under combined axial loading and torsion
Rodney L. Wilkinson, John M. Potter and John M. Papazian	213	Effects of short-term heating cycles on fatigue crack growth in 7075–T651
S. P. Timothy and I. M. Hutchings	223	Influence of adiabatic shear bands on the fatigue strength of a titanium alloy
R. Brown and G. C. Smith	229	A note on the influence of rest periods on the fatigue endurance of a titanium alloy
	i	Announcement
	iii	Information on Conferences/Seminars

Number 4

G. G. Chell	237	Fatigue crack growth laws for brittle and ductile materials including the effects of static modes and elastic–plastic deformation

VOL. 7 1984

P. Clement, J. P. Angeli and A. Pineau	251	Short crack behaviour in nodular cast iron
D. Taylor	267	The effect of crack length on fatigue threshold
Wu-yang Chu, Chi-Mei Hsiao and Tian-Hua Liu	279	Fatigue under cyclic compressive load
M. Gabra and C. Bathias	285	Interpretation of fatigue crack growth in aluminium alloys under programmed block loading
G. Ebi and A. J. McEvily	299	Effect of processing on the high temperature low cycle fatigue properties of modified 9Cr–1Mo ferritic steel
V. N. Kiselevsky and D. F. Kharitonov	315	In-reactor low-cycle fatigue of type 0Kh16N15M3B stainless steel
R. M. J. Kemp, D. J. Murphy, R. I. Butt, R. N. Wilson and L. N. Phillips	329	Effects of pre-moulded woven CFRP patches on fatigue crack growth and residual strength in 7475-T761 aluminium alloy sheet
	I	Announcement
	II	Information on Conferences/Seminars

OL.
7
984

VOL.
7
1984

AUTHOR INDEX

Ando, Z. 109
Angeli, J. P. 251

Bathias, C. 13, 285
Brown, C. W. 155
Brown, R. 229
Butt, R. I. 329

Chell, G. G. 237
Chu, W.-y. 279
Clement, P. 251

Davidson, D. L. 29
Diboine, A. 137
Dmytrakh, I. N. 1

Ebi, G. 299

Fuquen-Moleno, R. 121

Gabra, M. 13, 285
Greenan, A. F. 65

Hamada, N. 85
Hertzberg, R. W. 181
Horibe, S. 145
Hsiao, C.-M. 279
Hua, C. T. 165
Hutchings, I. M. 223

Jaccard, R. 181

Kelly, D. A. 75
Kemp, R. M. J. 329
Kharitonov, D. F. 315
Kimura, M. 195
Kiselevsky, V. N. 315

Laird, C. 145
Lankford, J. 29
Lee, J.-K. 145
Liu, T.-H. 279

McEvily, A. J. 299
Matsuoka, S. 195
Miller, K. J. 97
Murphy, D. J. 329

Nilsson, J.-O. 55

Ohnami, M. 85

Panasyuk, V. V. 1
Papazian, J. M. 213
Pedron, J. P. 137
Pelloux, R. M. 121
Phillips, L. N. 329
Pineau, A. 137, 251
Pook, L. P. 65
Potter, J. M. 213

Qingzhi, H. 41

Ratych, L. V. 1
Rios E. R. de los 97

Sakane, M. 85
Scutti, J. J. 121
Singh, G. 75
Smith, G. C. 155, 229
Socie, D. F. 165

Tanaka, K. 195
Tang, Z. 97
Taylor, D. 267
Timothy, S. P. 223
Tokaji, K. 109

Vecchio, R. S. 181

Wilkinson, R. L. 213
Wilson, R. N. 329

OL.
7
984